

The Cell Cycle Coloring Worksheet

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Part 1: Building a Foundation

What is the primary purpose of the cell cycle?

Hint: Think about the main functions of cell division.

- To produce energy
- To grow and divide cells
- To repair damaged cells
- To transport nutrients

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Which of the following are phases of interphase? (Select all that apply)

Hint: Consider the stages that occur before mitosis.

- G1 Phase
- S Phase
- G2 Phase
- M Phase

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- S Phase
- G Phase
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Describe the events that occur during the S phase of the cell cycle.

Hint: Focus on DNA replication and its significance.

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List the four stages of mitosis in order.

Hint: Think about the sequence of events during cell division.

1. Stage 1

2. Stage 2

3. Stage 3

4. Stage 4

During which phase of mitosis do chromosomes align at the metaphase plate?

Hint: Consider the arrangement of chromosomes during cell division.

- Prophase
- Metaphase
- Anaphase
- Telophase

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Hint: Consider the order of events in mitosis.

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- Metaphase
- Anaphase
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Part 2: Application and Analysis

If a cell fails to pass the G2 checkpoint, what is the most likely outcome?

Hint: Think about the consequences of checkpoint failures.

- The cell will proceed to mitosis
- The cell will enter apoptosis
- The cell will duplicate its DNA again
- The cell will immediately divide

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In a scenario where a cell has a malfunctioning tumor suppressor gene, what could be the potential consequences? (Select all that apply)

Hint: Consider the role of tumor suppressor genes in cell regulation.

- uncontrolled cell division
- Increased DNA repair
- Formation of tumors
- Enhanced cell cycle checkpoints

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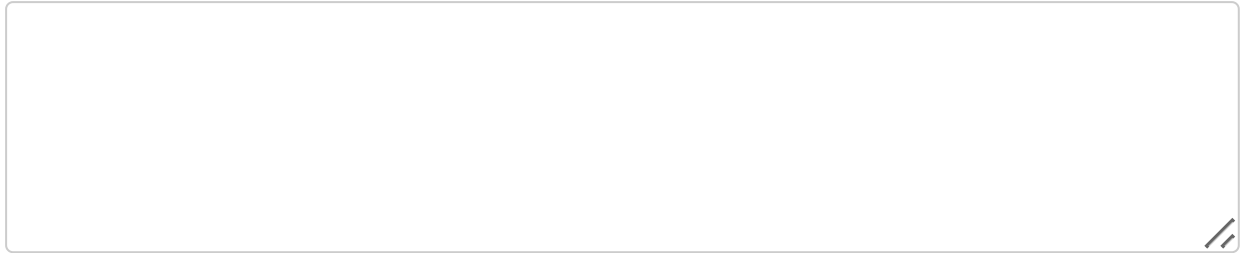
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Describe a real-world example where understanding the cell cycle is crucial in medical research or treatment.

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Which phase of the cell cycle is primarily responsible for ensuring that all chromosomes are properly attached to the spindle fibers before division?

Hint: Consider the importance of chromosome alignment.

- G1 Phase
- S Phase
- Metaphase
- Anaphase

Which phase of the cell cycle is primarily responsible for ensuring that all chromosomes are properly attached to the spindle fibers before division?

Hint: Consider the checkpoints in the cell cycle.

- G1 Phase
- S Phase
- Metaphase
- Anaphase

Analyze the relationship between oncogenes and cancer. Which statements are true? (Select all that apply)

Hint: Think about how oncogenes affect cell growth and division.

- Oncogenes can lead to cancer by promoting cell division
- Oncogenes are always beneficial for cell growth
- Oncogenes result from mutations in normal genes
- Oncogenes are involved in cell cycle checkpoints

Analyze the relationship between oncogenes and cancer. Which statements are true? (Select all that apply)

Hint: Think about the role of oncogenes in cell growth.

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Analyze how the failure of the metaphase checkpoint might affect cell division and lead to genetic disorders.

Hint: Consider the implications of improper chromosome segregation.

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Part 3: Evaluation and Creation

Evaluate the potential effects of a new drug that specifically targets CDKs. Which outcomes are likely? (Select all that apply)

Hint: Consider the role of CDKs in cell cycle regulation.

- Slowed cell division
- Increased apoptosis
- Enhanced DNA replication
- Reduced tumor growth

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Propose a research study that investigates a novel method for targeting tumor suppressor genes in cancer therapy. Describe the hypothesis and potential impact.

Hint: Think about innovative approaches in cancer treatment.

Propose a research study that investigates a novel method for targeting tumor suppressor genes in cancer therapy. Describe the hypothesis and potential impact.

Hint: Think about innovative approaches to gene therapy.

Design a brief outline for an educational video explaining the importance of the cell cycle in maintaining healthy tissue function. Include key points to cover.

Hint: Consider the main topics that should be included in the video.

1. Key Point 1

2. Key Point 2

3. Key Point 3